For the latter purpose, the diameter of element **39** is made slightly greater than the diameter of the core **7** upon which the yarn is to be wound so that the drive roller **1** bears gainst this part rather than against the core until a small amount of yarn **9** is wound on the core to increase the diameter sufficiently to disengage the drive wheel. As illustrated in FIGURE 2, the drive wheel may suitably be constructed in two parts consisting of a steel ring which is press fit onto the housing **11** and an outer ring which may consist of a laminated plastic material. A suitable material for the outer part of the drive wheel is fabric-reinforced phenolic resin.

When the illustrated apparatus is placed in operation, there is initially a rolling contact between drive roll **1** and stop **39**. As filamentary structure **9** is wound on tubular core **7**, the diameter of the core package is increased sufficiently to engage the drive wheel. The tubular core **7**, fitted onto rotatable chuck **5**, is held in place initially and during the lower rotational wind-up speeds by centering rings **25** and particularly by ring **29**. As the rotational speed of the chuck-core assembly increases, rings **27** expand radially to come into contact with tubular core **7**, thereby providing gripping means particularly adapted to secure the core while it is turning at higher rotational speeds. Centering rings **25**, being made of a relatively rigid material, provide for the maintenance of core concentricity at all windup speeds.

The chuck of this invention possesses the characteristics required for an efficient high speed winding operation. It is simple to construct and assemble, and the parts which require replacement in use may be molded or machined from relatively inexpensive materials. The cores upon which the yarn is wound are easily put in place and the final yarn package is readily removed from the chuck without the use of special tools or other devices. At the same time, the core is held firmly in place during the entire winding operation and the core and yarn package remain concentric about the spindle.

As many widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that this invention is not limited to the specific embodiments thereof except as defined in the appended claims.

What is claimed is:

1. An apparatus comprising a chuck adapted to receive a tubular core, said chuck comprising a spindle, a tubular housing rotatably mounted on said spindle, retainer means for holding the rotatable housing on the spindle, and certain types of annular rings mounted on said tubular housing including: (1) a first type being made of a relatively rigid but slightly depressible material and having an outside diameter substantially the same as the inside diameter of said tubular core; (2) a second type being made of a relatively compressible material having a relatively high coefficient of friction and having an outside diameter slightly greater than the inside diameter of said tubular core; and (3) a third type being made of a material capable of radial expansion due to centrifugal forces and having an outside diameter slightly less than the inside diameter of said tubular core.

2. The apparatus of claim **1** wherein said first type of annular ring is made of nylon, said second type is made of a flexible foamed structure, and said third type is made of a relatively high density elastomeric material.

3. An apparatus comprising a chuck adapted to receive a tubular core, said chuck comprising a spindle, a tubular housing rotatably mounted on said spindle, retainer means for holding the rotatable housing on the spindle, and certain types of annular rings mounted on said tubular housing including: (1) a first type having two portions, the first portion being a tubular core contacting portion made of a relatively rigid but slightly depressible material and the second portion providing a resilient support for said first portion in order to inhibit this first type of annular ring from acquiring a permanent set under the pressure of said tubular core, said first type having an outside diameter substantially the same as the inside diameter of said tubular core; (2) a second type being made of a relatively compressible material having a relatively high coefficient of friction and having an outside diameter slightly greater than the inside diameter of said tubular core; and (3) a third type being made of a material capable of radial expansion due to centrifugal forces and having an outsile diameter slightly less than the inside diameter of said tubular core.

4. The apparatus of claim **3** wherein the first and second portions of said first type of annular ring are made of nylon and a relatively high density elastomeric material, respectively; said second type is made of a flexible foamed structure, and said third type is made of a relatively high density elastomeric material.

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